WHAT IS CLAIMED IS:

1. A method for identifying a compound that inhibits the activity of at least one of KIN1 kinase, KIN4 kinase, GIN4 kinase, RAN kinase, ELM kinase, or HAL kinase in a fungus comprising determining the activity of the kinase before and after exposing the fungus to a test compound, wherein a reduction in kinase activity in the presence of the test compound indicates that the test compound is an antifungal agent, wherein the test compound has minimal toxicity to a non-fungal organism, and wherein the kinase domain of the KIN1 kinase has at least 46% sequence identity to a kinase domain of any one of SEQ ID NOs. 1-5, wherein the kinase domain of the KIN4 kinase has at least 55% sequence identity to a kinase domain of any one of SEQ ID NOs. 6-9, wherein the kinase domain of the GIN4 kinase has at least 55% sequence identity to a kinase domain of any one of SEQ ID NOs. 10-16, wherein the kinase domain of the RAN kinase has at least 55% sequence identity to a kinase domain of any one of SEQ ID NOs. 17-24, wherein the kinase domain of the ELM kinase has at least 38% sequence identity to a kinase domain of any one of SEQ ID NOs. 25-29, and wherein the kinase domain of the HAL kinase has at least 30% sequence identity to a kinase domain of any one of SEQ ID NOs. 30-42.

2. The method of claim 1, wherein the test compound reduces fungal growth.

3. The method of claim 1, wherein the test compound eradicates the fungus.

4. The method of claim 1, wherein the kinase activity is determined by comparing protein phosphorylation patterns in the fungus in the presence and absence of the test compound.

5. The method of claim 1, wherein the non-fungal organism is a mammal, animal, tree, or plant.

6. The method of claim 5, wherein the mammal is a goat, sheep, cattle, horse, cat, dog, pig, rat, mouse, primate, pig, or a human.

7. The method of claim 1, wherein the non-fungal organism is a fish, bird, or a reptile.

8. The method of claim 5, wherein the plant is selected from the group consisting of barley, wheat, corn, rice, cotton, oak, tomato, potato, Dutch elm, and Chestnut.

9. The method of claim 1, wherein the kinase domain of KIN1 kinase, KIN4 kinase, GIN4 kinase, RAN kinase, ELM kinase, and HAL kinase has between 80-90% sequence identity to a kinase domain of any one of SEQ ID NOs. 1-5, 6-9, 10-16, 17-24, 25-29, 30-42 respectively.

10. A method of identifying a compound having antifungal properties, comprising:

(a) culturing a fungus sample,

(b) treating the fungus sample with a test compound;

(c) determining, after the treating of step (b), the level of activity of the fungus the sample in comparison to an untreated control fungus sample;

wherein a decrease in the level of fungus activity of the treated fungus, compared with the control sample, indicates that the test compound is an antifungal agent, and wherein the fungus comprises at

least one of a KIN1 kinase, a KIN4 kinase, a GIN4 kinase, a RAN kinase, an ELM kinase, or a HAL kinase.

11. The method of claim 10, wherein the kinase domain of the KIN1 kinase has at least 46% sequence identity to a kinase domain of any one of SEQ ID NOs. 1-5, wherein the kinase domain of the KIN4 kinase has at least 55% sequence identity to a kinase domain of any one of SEQ ID NOs. 6-9, wherein the kinase domain of the GIN4 kinase has at least 55% sequence identity to a kinase domain of any one of SEQ ID NOs. 10-16, wherein the kinase domain of the RAN kinase has at least 55% sequence identity to a kinase domain of any one of SEQ ID NOs. 17-24, wherein the kinase domain of the ELM kinase has at least 38% sequence identity to a kinase domain of any one of SEQ ID NOs. 25-29, and wherein the kinase domain of the HAL kinase has at least 30% sequence identity to a kinase domain of any one of SEQ ID NOs. 30-42.

12. The method of claim 10, wherein the step of determining fungal activity in the fungus sample comprises at least one of determining chitin content or performing an agar dilution assay.

13. The method of claim 12, wherein a decrease in chitin staining or reduction in optical density indicates a reduction in growth of the fungus in the fungus sample.

14. A method for treating a subject having a fungal infection, comprising administering to a subject a compound capable of inhibiting kinase activity in a fungus, wherein the kinase comprises an amino acid sequence selected from the group consisting of SEQ ID NOs. 1-42, and wherein the compound does not inhibit kinase activity of a kinase that is endogenous to the subject.

15. A method of claim 14, wherein the compound reduces growth of the fungus or eradicates the fungus

16. The method of claim 14, wherein the subject is a plant selected from the group consisting of barley, wheat, corn, rice, cotton, oak, Dutch elm, and Chestnut.

17. The method of claim 14, wherein the fungus is located on the skin, hide or external surface of the subject.

18. The method of claim 14, wherein the subject is a mammal.

19. The method of claim 18, wherein the mammal is a goat, sheep, cattle, horse, cat, dog, pig, rat, mouse, primate, pig, or a human.

20. The method of claim 14, wherein the subject is a fish, bird, or a reptile.

21. The method of claim 14, wherein the compound is administered to the subject by spraying, injecting, ingesting, inhaling, swallowing or applying a topical cream, gel, liquid, powder, pellet, aerosol or fluid suspension containing the compound to the fungus on the subject.

22. The method of claim 14, wherein the fungus is an *Ascomycetes*, *Zygomycota*, *Deuteromycota*, *Mycophycophyta*, *Ascomycota*, *Gasteromycetes*, *Myxomycota*, *Oomycota* or *Hymenomycetes* fungus.

23. The method of claim 1, 10, or 14, wherein the fungus is an *Aspergillus flavus*, *Aspergillus fumigatus*, *Aspergillus glaucus* group, *Aspergillus nidulans*, *Aspergillus niger*, *Aspergillus terreus* group, *Blastomyces dermatitidis*, *Candida albicans*, *Candida tropicalis*, *Candida glabrata*, *Candida parapsilosis*, *Candida krusei*, *Candida lusitaniae*,

Coccidioides immitis, *Histoplasma capsulatum var. capsulatum*, *Paracoccidioides brasiliensis*, *Sporothrix schenckii*, *Absidia*, *Apophysomyces*, *Cokeromyces*, *Cunninghamella*, *Mucor*, *Rhizomucor*, *Rhizopus*, *Saksenaea*, *Syncephalastrum*, *Mortierella*, *Basidiobolus*, *Conidiobolus*, *Trichophyton*, *Microsporum gallinae*, *Microsporum canis mycorrhiza, arbuscular mycorrhiza, vesicular-arbuscular mycorrhiza* or *Ectomycorrhiza*.

24. A pharmaceutical composition, suitable for administration to a subject, comprising a compound that inhibits activity of a kinase in a fungus but does not inhibit any kinase endogenous to a subject infected with the fungus.

25. The pharmaceutical composition of claim 24, wherein the compound inhibits a kinase that has kinase domain amino acid sequence that has (i) at least 46% sequence identity to a kinase domain of any one of SEQ ID NOs. 1-5, or (ii) at least 55% sequence identity to a kinase domain of any one of SEQ ID NOs. 6-9, or (iii) at least 55% sequence identity to a kinase domain of any one of SEQ ID NOs. 10-16, or (iv) at least 55% sequence identity to a kinase domain of any one of SEQ ID NOs. 17-24, or (v) at least 38% sequence identity to a kinase domain of any one of SEQ ID NOs. 25-29, and or (vi) at least 30% sequence identity to a kinase domain of any one of SEQ ID NOs. 30-42.

26. The method of claim 10, wherein the fungus sample is a fungus or fungus extract.